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EDITORIAL.

Irrigation of Riverine Areas.

It is natural to assume that areas situated in the vicinity of a large river where soil conditions are suitable for padi growing, would be ideal for cultivation of this crop, as it would be expected that irrigation would present no difficulties. Such is not invariably the case, however, as is exemplified by many areas situated along the reaches of the Perak River.

On the areas in mind, padi has been grown for a great many years, and it is probable that cultivation of the crop was carried on under satisfactory conditions at some time in the past, but that changes in the depth of the river bed, and in its course, have changed conditions. The present position is, that irrigation of the crop by gravitation presents considerable difficulties, as the banks of the river are high and water in the river for parts of the year is at a lower level than the padi land, and no small streams are situated conveniently to allow of their being used for irrigation. For many years past, the cultivation of padi on such areas has been a very precarious occupation. The land is often too dry to allow of nurseries being sown and seedlings transplanted in the months of July and August, the usual time for padi planting, generally, in the part of the country concerned. Consequently, it has been impossible in most seasons to have the crop sufficiently well grown to withstand the flooding which nearly always occurs to a greater or lesser extent during the months of November and December.

In the present issue we have pleasure in reproducing a short, but informative article by Mr. A. G. Robinson, Adviser, Drainage and Irrigation, Malay States, in which the writer describes the putting into operation of a scheme, launched towards the end of 1933, of irrigating padi areas, both actual and potential, in the mukims of Bota and Lambor Kanan, lying along the Perak River. At the time when this enterprise was undertaken, there were two thousand acres of cultivated land, and five hundred acres of land in that area that could be brought under cultivation; there are now also prospects of bringing still more areas in the vicinity under cultivation.

It is hoped that this present scheme will show the way to the elucidation of the problem of irrigating other areas suitable for padi cultivation which lie near rivers, but which, up to now, have to rely on rainfall for their water.

The writer of the article points out that the scheme was intended to assist and to improve the somewhat precarious living conditions of the peasants domiciled in the area. Efforts to achieve this object alone would be worth while, even if the scheme failed to be successful from an economic point of view.

Poultry Feeding. In the feeding of poultry, and of course, other domestic stock, so that the best possible results may be obtained, it is highly important that special attention be given to the constituents of the food provided, since it is recognized that an excess of an individual item can as easily nullify careful planting as can a deficiency.

We publish in this number an account of the next step in the investigations on the feeding of poultry, which have been conducted at the School of Agriculture, Malaya, Serdang. In the previous article on this subject which appeared this year in the May issue of this Journal, attention was drawn to the importance of correct feeding when it is desired to raise pure bred fowls under intensive or semi-intensive conditions, and the results of tests in which standard rations were given to young chicks were recorded.

It is scarcely necessary to point out that to terminate such investigations at that stage would be very unsatisfactory. This being so, an extension of the work was embarked upon, this time to embrace investigations into the feeding of growing chicks.

In the article which we print in the present number the results of these investigations obtained with three groups of Rhode Island and one group of Light Sussex are set forth in tabular form, and the proportions of the constituents of the food mixture used are given. This mixture is considered by the writer of the article to be satisfactory, both from the point of view of its efficiency in promoting the growth of the chicks, and of its comparatively low cost.

Rural Lecture Caravan. More than five years have elapsed since the inauguration of the scheme for spreading agricultural knowledge among the peasantry by means of lectures and demonstrations, through the medium of a caravan of a type fit to travel on all primary and secondary roads. The first description of this caravan, compiled by officers of the Co-operative Societies Department and of the Department of Agriculture, S.S. and F.M.S., appeared in this Journal in May 1931.

Taking into consideration the comparatively long period during which the caravan has been operating, we are now convinced that a useful purpose would be served in summarizing the work accomplished, the difficulties encountered and other facts—particularly those connected with capital costs of the caravan and equipment, running costs, and the methods by which knowledge of up-to-date agricultural practice is imparted to rural populations—which would undoubtedly be of service to Agricultural Departments in other countries not yet possessing, but desiring, adequate facilities for disseminating propaganda among the peasantry.

In the article which we reproduce in this number, full information in respect of these details is supplied.

It is highly satisfactory to note that definite results of far-reaching importance have been achieved during the five years of active service of the Caravan. These results are reflected in the general improvement in agricultural products and in the amelioration of living conditions in villages, due to the increase in membership of the General Purposes Co-operative Societies, as a result of lectures delivered by officers associated with this scheme.

The Germination of Padi.

Among the peasantry of Malaya there exist many beliefs in relation to procedure in padi cultivation. One of these beliefs concerns the age of padi which is intended for sowing purposes. According to this particular belief, if satisfactory germination is to be expected, padi should be at least 100 days old at the time of sowing.

We include a short article by Mr. C. H. Burgess, Agricultural Officer, Krian, in which the author describes experiments designed to throw light on this belief.

Original Articles.

IRRIGATION OF RIVERINE AREAS

Bota-Lambor Kanan Pumping Scheme, Perak River

BY

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As long ago as 1912 a proposal was made to pump water to irrigate bendangs* on the left bank of the Perak River between Layang-Layang and the southern boundary of Kuala Kangsar District.

Successive District Officers tried to revive interest in the proposal, but much of the potential padi area intended for irrigation became planted with rubber.

Towards the close of 1931 when the new Department of Drainage and Irrigation was about to be formed, the District Officer, Kuala Kangsar, drew the attention of Government to the question of irrigation of bendangs along the Perak River below Parit, pointing out that the matter seemed to have died away more or less abortively. He stated that, as a result of his visit to the mukims of Bota, Layang-Layang and Lambor, he was greatly impressed by the great disadvantages which the large existent bendang areas suffered from, owing to absolute lack of water. The four densely populated mukims lying below Parit in this district, he added, depended entirely for their harvest on the rain which they may or may not get. The areas, in good seasons, are heavy-producing and, as irrigation on a grand scale from the Perak River seemed remote, he suggested small pumping schemes so that the risk of total failure of crops, and consequent widespread distress, such as was presaged that year as the result of drought, would be rendered comparatively remote.

The immediate problem was to supply irrigation to the present cultivated area of 2,000 acres and to 500 acres of adjoining uncultivated padi land. It would be necessary to pump the irrigation supply from the Perak River and to deliver it in an open earthen canal for a distance of no less than eleven miles to irrigate the bendangs interspersed between well populated kampongs along the bank of the Perak River.

In order to bring the scheme within the realms of practical economics, it was designed so that irrigation would be by rotation. Half of the area, let us say Bota Mukim, would receive full irrigation from July to September. Planting in the other half, or Lambor Mukim, would be delayed until October. Both areas would receive half supply during the wet season, October to December. An eight months padi would be planted which would be harvested in Bota Mukim

* bendang = a more or less definitely defined area of flat low-lying land suitable for padi cultivation.

during the dry month of February when the Lambor area would be receiving full supply, and the crop on the latter area would be harvested in the dry month of June. The size of the pumping plant was thereby reduced by half. Even so the estimated cost of the scheme was $30,000, and a water rate of not less than $3 per acre would be required to meet interest on capital, depreciation of machinery, and the annual cost of running the plant.

In recommending the scheme for the consideration of Government it was pointed out that the capital cost was less than the value of the annual crop which the scheme would save in times of drought.

The considered view of the Perak State Drainage and Irrigation Board was:—

> "..... that this work should be regarded as an experiment, the results of which, if successful, will be of great value generally for all areas, not only in Perak but elsewhere in the Federated Malay States, which have a similar problem of padi lands near large rivers dependent on the vagaries of rainfall for the success of the crop. A sum of $30,000 need not be considered an excessive amount to pay for such an experiment, and it is not considered that Government should seek to recover the cost of the experiment or any part of it until it has been proved successful.
>
> "Secondly, it is not considered probable that it will ever prove feasible to impose so high a rate as $3 per acre. In other words, the expenditure on this particular scheme cannot be regarded as likely to be a good economic proposition. Its justification must rest on other grounds, connected with the general welfare and advancement of the rural population. The scheme is calculated to rescue from penury a population of Perak Malays who live very precarious lives, more especially since the slump in rubber: it is in fact a relief work of a permanent nature and of the right kind, in that it will increase the local production of padi.
>
> "The beneficiaries should certainly contribute, by means of a drainage rate, towards the cost of the work, to the utmost which they can reasonably pay; but the time of imposition and the incidence of this taxation must be left to local discretion."

It was therefore on these political rather than economic grounds that Government approved the scheme.

The scheme was launched at the end of 1933. The best available site for an intake on the Perak River was selected and the lines of the tali ayer* which had been surveyed in the previous year were set out and construction of the canal on contract with the local inhabitants was commenced.

The pumping plant consists of a 68 h.p. Allen Diesel engine coupled to a Gill axial flow pump capable of delivering 25 cubic feet of water per second, equal to nearly twice the water supply of Kuala Lumpur town.

Water is drawn from the Perak River through a 20 in. diameter cast iron pipe accurately aligned on steel channels embedded in concrete laid up the slope of the bank at an angle of 45 degrees. The pump of the helix or screw blade type is housed in the submerged end of the pipe and the pump shaft is fixed along the centre line of the pipe by brackets designed to offer the least resistance to flow in the pipe.

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* tali ayer = irrigation channel.

The engine and air compressor for starting the engine, and also the bevel gear drive to the pump shaft, are housed in a corrugated iron shed on the bank of the river. The engine and bevel gear encasement are mounted on a concrete plinth sufficiently high to prevent the cylinders being flooded except in the event of an extraordinarily high flood.

On reaching the top of the bank the rising main is forked, one leg of the fork containing the pump shaft extension to the bevel gearing, and the other leg connecting up with the horizontal 20 in. diameter delivery pipe which passes under the engine plinth and discharges into a concrete intake at the head of the irrigation canal.

Cooling water is supplied by a set of four water circulating tanks in addition to a direct supply when necessary from the rising main to the engine water jacket which is brought into use only for short periods of the daily run on account of the turbidity of the water.

Close driven sheet piling of 3 in. timber with suitable timber guide piles and runners are used to revet the sides of the steep bank leading to deep water in the river, and a wrought iron screen is provided to prevent débris entering the pipe and clogging the impeller.

Last year was the first year of operation, and considerable care and attention were given to the working of the scheme by the Agricultural Officer, Perak Central, and the Drainage and Irrigation Engineer working in close co-operation.

The views of the Drainage and Irrigation Department on the working of the scheme are given in the Annual Report of the Department for 1935, as follows:—

> "Pumping was commenced in July and the pump was kept running practically continuously until 19th December. A lavish supply of water was given and the prospective crop is greatly in excess of anything formerly obtained.
>
> "The quantity of water pumped was 231,467,800 cubic feet and from the beginning no shortage of water was experienced.
>
> "The year 1935 must be regarded as experimental from every point of view. The amount of water pumped was greatly in excess of that which should have been required; this was largely because, though the ryots were told to prepare their lands early as water would be available in the month of June, practically no preparation was made.
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> "The arrival of water expelled former doubts in the minds of the cultivators and gave them confidence in the works but planting was late and occupied a long period.
>
> "The scheme is unique in that the pumped water is delivered into a canal 11 miles long to irrigate some sixteen areas of padi interspersed between kampongs. These areas vary in size from 400 acres to less than 20 acres and comprise in all some 2,000 acres already in cultivation and 500 acres of potential padi land.
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> "During the planting season several visits were paid by the Drainage and Irrigation Engineer and the Agricultural Field Officer to examine the

functioning of the scheme. Most of the areas were found to be well cultivated and well supplied with water; in others, there was excess of water owing to defective drainage and in some there was a shortage of water due to a sandy sub-soil.

"With the abundant rainfall of October and November, little or no pumping should have been required but it was not possible to stop the pump at all because the water requirements of no two bendangs were alike.

"These are details which will require the closest co-operation of the two departments of Irrigation and Agriculture for the improvement of the irrigation service by meeting as far as possible the requirements of the cultivators while getting them to co-operate in every way.

"The season's crops are said to be very promising and by far the best ever grown in these mukims, and its efficient management will have to be built up year by year by close observation and by instituting a number of measures for the conservancy of water in some areas and improved drainage in others."

The Agricultural Officer has reported as follows:—

"It is satisfactory to report that apart from one or two instances, no major difficulties have been experienced and considering that this is the first planting season under the new scheme conditions may be stated to be satisfactory. The main tali ayer has settled well and no serious breaches have occurred. Seepage through the banks has also lessened as the earthwork has set, and water conditions in small rubber holdings adjacent to the tali ayer have improved. This point is being carefully watched from the drainage point of view and any outbreaks of root diseases in the rubber holdings.

"The main problems as regards the bendangs seem to be localised levelling and the construction of cross batas by the ryots and in some cases drainage. It may be noted here that drainage problems in the Bota area are not expected to be so bad as those in the Lambor area. There is a natural slope from Bota towards Lambor and consequently the main drainage problems will be connected with the latter area.

"Planting dates will cause some difficulty as some ryots plant earlier than others and consequently want water when other later planters want their bendangs dry. It will be necessary for Penghulus and Ketua Kampongs to divide the bendangs into areas which must all be planted at the same time. In this way water control will be more efficient and there will be fewer disputes as to who wants water and who does not. A large area is difficult to irrigate when split up amongst so many cultivators and the difficulties are only increased when they carry out planting in a haphazard manner."

In December 1935, the area was visited by Dr. Tempany, late Adviser on Agriculture, Malay States. He was greatly impressed by the excellent growth made and was told it was by far the best crop ever grown in that area.

Irrigation by rotation has so far not been tried. Last season's crop was late planted, and the whole area received irrigation at the same time, and, therefore, at half duty, the duty of water in this scheme being considered to be 100 acres to the cusec* during dry weather.

The present view of the State Drainage & Irrigation Board, is that the season for Lambor Mukim should be fixed for January-July and in Bota Mukim July-January, the objection to October planting being the probability of flooding from the Perak River destroying the young seedlings. An experiment with a January-July crop is now in progress by the Agricultural Department on a 20 acre plot which is receiving full irrigation from the pumping plant.

Another pumping scheme immediately downstream of the Lambor area is under construction in Pulau Tiga Mukim on the Lower Perak side of the District boundary, to serve an area of about 3,000 acres.

As will have been noted, these schemes have a greater significance than their immediate object of irrigating areas where conditions have been so precarious. Furthermore, to the east of these areas there is a vast swamp along the right banks of the Tumboh and Kinta Rivers, some of which in times past has been cultivated; but for many years now owing to silting of the Tumboh and Kinta Rivers it has lain waste and kampongs have become desolate. There are probably some 30,000 acres available in the triangle between the three rivers, and if brought into cultivation, irrigation would be practicable by a deep canal off-take from the Perak River, and without the necessity for an expensive barrage, the whole of this area, excepting the Bota area, would be commanded by the water level that would be available in the canal at low water stage in the Perak River.

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* "Cusecs" is an abbreviation for cubic feet per second.

A RATION FOR GROWING CHICKS

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Introduction.

In a previous article (1), the author drew attention to the importance of correct feeding when raising pure-bred fowls under intensive or semi-intensive conditions, and advocated for young chicks a dry mash containing a liberal proportion of biologically good proteins, in the form of dried skim milk, balanced by carbohydrates, fats, minerals and vitamins. As a logical extension of that work, investigations have been carried out at the School of Agriculture, Serdang, on the feeding of growing chicks, *i.e.* young fowls from the age of 12 weeks (when weaning from chick mash is complete) until they are about to come into lay or are disposed of as table birds.

Good feeding is just as important with growers as with young chicks, but fewer biological and economic difficulties appear to be involved. Thus, general experience indicates that growers do not require more than about 12 per cent. digestible protein in the ration, and that they can make satisfactory use of various concentrates such as whale meat and groundnut or soya-bean cake which are of inferior biological value when fed to young chicks. Suitable growers rations are therefore less expensive, weight for weight, than chick rations.

According to Halnan (2), the energy requirements of balanced poultry mashes are about the same (60 to 65 per cent. of starch equivalent) for young chicks, growers and layers, the increasing demand for energy as body weight increases being met by a larger intake of food. As with young chicks, however, proteins and energy require to be suitably balanced by minerals and vitamins.

Growers Mash.

With the above considerations in mind, the following mash was evolved and has been tested at the School on various groups of growing chickens, mainly pure-bred Rhode Island Reds.

Growers Mash.
(Parts by weight)

Padi, ground, husk discarded	...	33 parts
Maize, yellow, ground	...	20 ,,
Bran, white cargo	...	20 ,,
Whale meat meal	...	10 ,,
Groundnut cake	...	10 ,,
Steamed bone flour	...	2 ,,

Powdered limestone	...	1 part
Salt	...	1 ,,
Red palm oil	...	3 parts
		100 ,,

(supplying about 12.3 per cent. digestible protein and 63.5 per cent. starch equivalent).

For purposes of comparison, average weights cited by Card and Henderson (3) were employed and are given in Table I. These weights cover the period from 14 to 22 weeks of age and apply only to pullets. Corresponding figures for cockerels are not available, but they would normally be somewhat higher. So far it has not been possible to attain these average weights with Rhode Island pullets raised at the School, and, for this reason, increases in weight have been converted into percentages to enable a fair comparison to be made.

Table I.
Average Weights of R.I.R. Pullets in U.S.A.

Age	Average weight	Percentage increase during past 14 days	Percentage increase over weight at 14 weeks
14 weeks	41.1 ozs.	—	—
16 ,,	46.6 ,,	13.4	13.4
18 ,,	52.2 ,,	12.0	27.0
20 ,,	58.9 ,,	12.8	43.3
22 ,,	64.6 ,,	9.7	57.2

The birds were accommodated in small grassed runs and housed in portable night-arks. Growers mash was fed from the 12th to the 18th week, after which layers mash was gradually introduced, the change-over being completed by the end of the 21st week*. The mash was fed dry and *ad lib.* from 7 a.m. to 6 p.m. daily, with fresh greenstuff each afternoon. In addition, a small quantity of whole grain (padi) was given from the 12th week onwards, beginning with a few grains scattered over the mash and leading to a separate evening feed which was gradually increased to 1½ ozs. per head by the 22nd week. The birds had constant access

* Rhode Island and Light Sussex pullets raised at the School usually come into lay at about 6 months of age — a month or so earlier than is usual in Europe and America. This sexual precocity is probably due to climatic and hereditary factors rather than to feeding. So long as pullets are up to breed weight, early sexual maturity is an advantage. But it should be discouraged in fowls which are under weight for their age, and the desirability of introducing layers mash at a somewhat later stage will be investigated when opportunity presents itself. (G.E.M.)

Table II.

Growth Rate of Heavy Breed Pullets at Serdang.

Age	Card & Henderson's Figures			R.I.R. Group 48 (16 pullets)			R.I.R. Group 50 (7 pullets)			R.I.R. Group 52 (6 pullets)			L. S. Group 49 (8 pullets)		
	Average Weight	Percentage Increase in past 14 days	Percentage Increase over Weight at 14 weeks	Average Weight	Percentage Increase in past 14 days	Percentage Increase over Weight at 14 weeks	Average Weight	Percentage Increase in past 14 days	Percentage Increase over Weight at 14 weeks	Average Weight	Percentage Increase in past 14 days	Percentage Increase over Weight at 14 weeks	Average Weight	Percentage Increase in past 14 days	Percentage Increase over Weight at 14 weeks
14 weeks	41.1 ozs.	—	—	34.9 ozs.	—	—	34.0 ozs.	—	—	29.0 ozs.	—	—	39.5 ozs.	—	—
16 ,,	46.6 ,,	13.4	13.4	40.0 ,,	14.6	14.6	41.0 ,,	20.6	20.6	33.0 ,,	13.8	13.8	46.4 ,,	17.5	17.5
18 ,,	52.2 ,,	12.0	27.0	45.5 ,,	13.7	30 4	47.0 ,,	14.6	38.2	38.8 ,,	17.6	33.8	53.2 ,,	14.7	34.7
20 ,,	58.9 ,,	12.8	43.3	51.6 ,,	13.4	47.8	50.4 ,,	7.2	48.2	45.6 ,,	17.5	57.2	60.0 ,,	12.8	52.2
22 ,,	64.6 ,,	9.7	57.2	56.6 ,,	9.7	62.2	58.7 ,,	16.4	72.6	53.0 ,,	16.2	82.8	67.4 ,,	12.3	70.6

to coarse sand and crushed limestone. The layers mash contains the same ingredients as the growers mash, but the protein concentrates are increased at the expense of ground padi in order to provide the additional food material required for egg production.

Results.

The results obtained with three groups of Rhode Island and one group of Light Sussex pullets are given in Table II. For investigations of this nature, Light Sussex are reasonably comparable with Rhode Islands as both rank as heavy breeds.

It will be seen that the average increase in 8 weeks varied from 62.2 to 82.8 per cent. of the average weights at 14 weeks of age, all groups exceeding Card and Henderson's figure of 57.2 per cent., and that on only one occasion did the fortnightly increase fail to reach the adopted standard.

It would thus appear that, for purposes of growth, the ration described herein is satisfactory.

Excluding transport charges from local dealers and the cost of grinding and mixing, the cost of the growers mash at the School is about $2\frac{1}{2}$ cents per lb. This also is considered satisfactory.

Literature Cited.

(1) The Food Requirements of Young Chicks, G. E. Mann, *Malayan Agricultural Journal* Vol. XXIV, No. 5. 1936.

(2) Scientific Principles of Poultry Feeding, E. T. Halnan, Ministry of Agriculture and Fisheries, Bulletin No. 7, 1934.

(3) Farm Poultry Production, Card and Henderson.

THE RURAL LECTURE CARAVAN.

Compiled by Officers of the Co-operative Societies Department and of the Department of Agriculture.

A previous article by Corrie and Spring has been published* describing the original construction and fitting of the Rural Lecture Caravan, which is run jointly by the Co-operative Societies Department, the Department of Agriculture and the Rubber Research Institute of Malaya. This article also contained an account of the objects for which the Caravan is maintained and the methods of working used during the first few tours.

Subsequent experience led to certain modifications both in the equipment of the Caravan itself and in the general organization of its tours. In the present article these modifications are described and a summary is given of the work that has been done through the agency of the Caravan from the time the first tour was commenced in November, 1930, until the end of December, 1935.

Construction and Equipment.

The chassis purchased was a Morris 1½ ton lorry chassis costing $2,760.58 in 1930.

The Caravan was originally provided with a trailer for the conveyance and display of exhibits, photographs and models. This trailer and the coach-work body of the Caravan were built by the Federated Malay States Railways at a cost of $2,938.13. The body was originally fitted with two comfortable sleeping berths placed above clothes cupboards. It also had complete crockery and other furnishings and an oil burning cooking range. A full account of it is given in the earlier article referred to above. It was found, however, after a few tours that the driver and the cinematograph and lantern operator, who soon became the only two officers actually travelling in the Caravan, were able to obtain food for their needs everywhere in the country without cooking their own meals. Consequently, when the abandonment of the trailer and modifications in the lighting set, as described below, rendered necessary the provision of extra storage space in the Caravan itself, the internal fittings for cooking apparatus and crockery were all removed.

Trailer. This was fitted to take cases and bottles of agricultural exhibits, boxes of photographs and models of such things as improved copra kilns and poultry houses. It was so built that the two sides and the back could be let down to form tables for the display of these exhibits. Its body was carried on a light chassis provided with two wheels and a triangular coupling which could be attached to the back of the Caravan.

After a few months' experience it was found that the weight of the trailer caused an excessive strain on the back axle and differential of the Caravan. Furthermore, owing to the size of the body of the Caravan, the driver was unable

* *Malayan Agricultural Journal*, Vol. XIX, p. 229, May, 1931.

to see the trailer—a serious disadvantage in narrow roads. It was also impossible to reverse the Caravan into parking places whilst the trailer was attached. After considerable experience of these difficulties it was decided in September, 1932, to abandon the trailer entirely and to refit the interior of the Caravan to take all exhibits.

Modifications of Internal Fittings. The spaces below the sleeping berths were cleared of their original fittings and were divided up into shelves and cupboards to carry boxes of photographs, cases of glass bottles and flat show cases. The two partitions closing these spaces off from the central alley-way were each made in one piece. They were removable and fitted with folding metal legs, so that they could be used as tables for displaying exhibits. Space was provided under the two cupboards on either side of the back compartment for the two lighting sets described below. On either side of the Caravan was fixed a metal tube frame over which canvas could be stretched to provide shade for the tables; each frame was hinged so that it could be folded down against the side of the Caravan when not in use.

Lighting Set. The Caravan was first fitted with a dynamo which was driven by a belt passing over the outside of the tyre of one of the rear wheels, the latter being raised from the ground by a jack.

In practice, this arrangement gave very bad service. The 20 h.p. engine of the Caravan was run at full speed to do the 2 h.p. work of rotating the dynamo. The wear on the differential gear in consequence of driving one wheel at full speed for hours on end, whilst one wheel was motionless, made expensive replacements of this gear necessary in a few months, and later a complete replacement of the transmission became necessary. The belt used for the drive was the cause of considerable trouble and the light flickered and fluctuated and proved unreliable.

This system was abandoned in October, 1931, and a small 2½ h.p. Blackstone engine was purchased for $200. It was found that satisfactory running was not possible with the small dynamo which had been affixed to the running board. A dynamo of stronger construction was obtained for $350 and fixed by direct drive to the Blackstone. This, mounted on a metal bed, is a complete power unit which may be moved from the Caravan and taken on launches for river trips. A second set of Blackstone engine ($200) and dynamo ($180) was purchased in December, 1933, thus allowing overhaul and repairs to be done at leisure without interrupting the tours of the Caravan. These composite lighting sets have not given entirely trouble-free service, and experience leads to the opinion that in the long run a stronger and somewhat heavier complete outfit, such as is made by manufacturers of lighting sets, would probably prove as cheap in the end and more efficient.

Loud Speaker. With the addition to the Caravan of lantern slides and lectures on them, it became necessary to employ artificial aid to the human voice. At first a megaphone was used, but this is almost impossible to use correctly when the lecturer is at the same time pointing to the screen. An amplifier, incorporating gramophone and microphone encased in a strong portable box, was provided in

1934 at a cost of $315. A long trumpet-shaped horn gives the sound constant direction towards the audience and prevents resonance in the microphone which must be stationed near to the screen.

It should be mentioned in concluding this account of the Caravan and its equipment that, before any construction work was commenced, information was obtained from such sources as were known concerning the design and fitting of similar caravans used for propaganda purposes in other tropical countries. At that time information was not very plentiful. Moreover it did not necessarily follow that a design and equipment suitable for another country would be best suited to conditions in Malaya. Consequently, although the information obtained was carefully considered, knowledge had to be acquired through local experience, a process involving some measure of trial and error. The original design and the various modifications found necessary have been described in some detail in the hope that experience in Malaya may prove useful to others wishing to construct and equip caravans for similar purposes in other parts of the tropics.

Weight of Caravan.

Owing to the size of the Caravan body, larger tyres were fitted and the rear axle springs were strengthened with an extra leaf to allow a safety margin for cornering. The total weights of the Caravan are not, however, excessive, although the additional weight of the lighting sets was not allowed for in the initial construction.

When loaded with lighting set, etc. ready for the road the weights of the Caravan are:—

Front axle	...	18½ cwts.
Rear ,,	...	2¼ tons

Mileage.

The Caravan, although constantly on tour, does not cover a large mileage because the journeys are arranged so that visits are paid to successive points not necessarily very far apart, and the Caravan stays in each place two nights.

Approximately the mileages covered by the Caravan are:—

November 1930, to June 1932	...	10,000 miles
June 1932, to April 1934	...	10,000 ,,
April 1934, to December 1935	...	8,775 ,,

giving a total of approximately 30,000 miles in 5¾ years.

Miles per Gallon. The Caravan runs at about 14 miles per gallon on long runs with slightly lower figures on general running.

The bills from which the statements of costs are compiled include the petrol and oil used for the lighting set. The proportion of hours of lighting to hours of travelling varies slightly according to the tours; for instance a long run from Kuala Lumpur to Penang may form part of one tour, but the average tour works out at approximately a consumption of one gallon of petrol for 9 miles including both lighting and travelling. Lubricating oil consumption is not expensive as the mileage run by the vehicle is so low.

Summary of Tours.

The Caravan was completed in the third quarter of 1930 and commenced short experimental tours in November of that year. The following is a schedule of tours of the Caravan from 1931 to 1935. Some tours are short (of ten days' duration), others are long (up to three months' duration). After some experience of the Caravan, it was found that the period of five nights before full moon and five nights after full moon was unsuitable for projections on a screen standing in the open, owing to the light of the moon falling upon the sheet. Tours are, therefore, arranged to employ these ten nights in giving shows on estates or in places in which a covered hall can be secured.

Tours of the Caravan.

	Penang & P.W.	Perak	Selangor	Pahang	Negri Sembilan	Malacca	S'pore	U.M.S.	Total
1931	1	3	5	— (river mukims)	2	1	—	—	12
1932	1	3	2	1	1	1	—	—	9
1933	1	3	4	1	1	1	—	—	11
1934	1	3	5	1 (river mukims & P. Tioman)	1	1	1	—	13
1935	2	2	2	1	3	2	—	Johore Kedah	14
								Total ..	59

Places Visited. A record is kept of every place in which a show is given and of the films and lectures which are given there. In the following schedule a summary of this record is shown. In certain towns, several shows have been given and this accounts for those places to which several visits have been made. In such cases, the audiences have not necessarily been composed of the same classes of persons; for instance in certain towns some shows may have been given of Malay films or lantern slides and at another opportunity a show may have been given of the Tamil films.

The Caravan has proved a most useful adjunct to District Agricultural Shows and it was to attend the State Shows at Alor Star and Muar that it visited Kedah and Johore in 1935.

It has also served a useful purpose in connexion with the All-Malayan Padi Competition, as advantage has been taken of the opportunity presented by the various tours in the last two years to give lectures on the points constituting a good sample of padi for exhibition purposes and on the more important faults in samples with their causes.

Summary of Places Visited.

	Visited once.	Visited twice	Visited 3 times	Visited 4 times	Visited 5 times	Visited 7 times of	Total No. Shows
Singapore ...	8						8
Malacca ...	32	11	4	1			70
„ estates ...	7						7
Negri Sembilan ...	20	11	7	1			67
„ estates ...	22	2					26
Selangor ...	26	16	9	1	1	1 (K. Lumpur)	101
„ estates ...	45	7					59
Pahang ...	37	16	3	1			82
„ estates ...	3						3
Perak ...	59	22	11	9	2		182
„ estates ...	8						8
Penang and Province Wellesley ...	22	4	3	3			51
„ estates ...	8						8
Kedah ...	1						1
Johore ...	1						1
Total number of shows given, 1931 to 1935 ...							674

Programmes.

Instruction given through the medium of the Caravan has two distinct purposes. The first is to show the peasants in a general way by means of the films that improvements in existing conditions or methods are possible in various directions. When interest has been aroused in the possibilities in any one direction, then the second purpose is to give detailed information in lectures, illustrated by lantern slides or by models, specimens and photographs, on one specific subject such as is shown in the list given below.

In the earlier years the Caravan remained at each centre visited for one night only, but as it was found that the programme tended to become overloaded and mentally indigestible, the experiment was tried at the end of 1934 of extending each visit to two days, the films being shown usually on the first night and lectures on specific subjects being given on the second afternoon and evening, with possibly one film to conclude the programme. This procedure has been continued regularly since the beginning of 1935. The exact arrangement of the programme varies somewhat, but it has been found advisable to restrict the lectures to not more than two subjects if the information given is to be effectively absorbed. Lighter entertainment is provided in the form of a film cartoon, and of gramophone records of Malay or Indian music played during intervals in the programme.

Lectures illustrated by models and other exhibits are given between 4.30 or 5 and 6 o'clock in the evening, while those illustrated by lantern slides commence about 7.30 or 8 p.m. and the whole night's programme may continue until well after 10 p.m.

The subjects of the films shown and the lectures given naturally vary according to the interests of the audience and the crop or crops of major importance at each centre. Thus films and lantern slides dealing with the problems of rubber small-holders are shown in centres where rubber is the most important crop, while in other places the subjects may be coconuts or padi. Other films of more general application, such as the co-operative films inculcating thrift, are suitable for inclusion in most programmes.

The lectures are actually delivered by the Malay Co-operative Officer, one or more of the Agricultural Assistants and the Rubber Instructor stationed in the area in which the Caravan is touring, each on his own subject. Notes drafted by European officers are supplied on agricultural subjects.

It is usual to invite a local Chief or Headman to preside at the meetings at each centre visited, in order to add dignity and a measure of formality to the occasion.

Attendances at afternoon lectures vary from about 50 to 200, and at evening displays from about 200 to 2,000 persons according to the density of the population in the neighbourhood of the particular centre visited.

Films. The following films are carried by the Caravan:—

Title	No. of Reels	Audience	Lesson of the Film
Mat and Idris ...	3	Malay	Thrift
Saving of Hj. Hassan ...	4	,,	Production of better rubber.
Food First ...	4	,,	Production of foodstuffs.
Rezeki ...	2	,,	Cultivation of padi.
Padi ...	3	,,	Use of selected padi strains.
Eggs ...	1	,,	Marketing of eggs.
Pengkalen Lomba ...	4	,,	General Co-operation.
Manap & Mahmud ...	2	,,	Animal husbandry.
Malay Regiment ...	1	,,	Malay Regiment's activities.
Cartoon ...	1	—	Introductory film.
Malaya, the Land of Opportunity ...	5	Tamil	Thrift.
How Govindan saved Money ...	2	,,	Vegetable allotments.
How Karuthan saved Money ...	2	,,	Animal husbandry.

(The last two films, photographed in 1935, will be available for the Caravan in 1936).

All these films were produced and photographed by members of the Departments concerned, with the village people themselves, or in a few cases Malay professionals, as actors.

Lantern Slides. The following subjects are dealt with by lantern slides or by means of models and exhibits, or both, with appropriate lectures thereon:—

Mouldy Rot disease of rubber trees.
Preparation of sheet rubber on small holdings.
A rubber smoke cabinet for small-holders.
Poultry housing.
Copra production.
Minor crops for small-holders.

Cost of Films.

The cost of cameras and projectors and other necessary equipment for film work cannot easily be apportioned to the films which are produced for the Caravan, because it is necessary to keep such equipment up to date by occasional replacements and renewals. These items are therefore shown separately in the schedules attached.

The cost of films includes the emoluments paid to actors, and necessarily includes the percentage of film scenes photographed, but discarded during editing or requiring to be re-photographed for various reasons. This percentage varies mainly with the skill of the photographer in obtaining correct exposure and with the skill of the actors in performing their parts. In films used for propaganda purposes, it is essential that the actors should be natural and the background and scenery should be that to which the audience is accustomed. This precludes to a great extent the use of stage effects. There is an element of luck in obtaining actors who manifest spontaneously the ability to perform their parts. The expense entailed in photographing certain scenes two or three times until the action is natural is probably not as great as the expense which would be entailed in employing very good actors (if they were available) and relying upon make-up and stage effects to achieve the requisite appearance and naturalness.

The expense of the films has varied a great deal in each case. The average works out at approximately $200 per reel of 400 feet including all titles and captions.

Results.

Although the Caravan tours sow the seeds of new ideas and provide more detailed instruction to a certain number of interested individuals, they have to be followed up for several months by lectures, demonstrations and advice from the local officers of the two Departments and the Institute, to ensure that the lessons first taught from the Caravan are translated into action by the majority of peasant proprietors in any given area.

By these means definite results have been achieved. One such result has been an increase in the number of General Purposes Co-operative Societies. These are formed for improving village surroundings by maintaining access paths and

mosque compounds, and by removing litter from the neighbourhood of houses; for constructing minor irrigation works for padi fields, for destroying rats, squirrels or wild pigs when such pests are numerous enough to do serious damage to crops; and for carrying out any similar work of general benefit to the health and prosperity of village communities. Other results have been the greater production of copra of improved quality by land owners themselves on approved types of kiln, the preparation of rubber sheet of better quality, the use of the small smoke cabinet in various localities, the more extended use of pure strain padi in the main rice growing areas, and the better housing and better care of poultry in some districts.

Running Costs of the Caravan from 1929 to 31st December 1935.

(a) On purchase:			
Caravan and fittings	...	$9,102.54	
Loud-speaker, etc.	...	315.00	
Blackstone engines and lighting equipment		1,257.90	.$10,675.44
(b) On running:			
Wages	...	5,770.00	
Petrol	...	2,502.81	
Oil	...	178.40	
Tyres	...	258.20	
Punctures	...	10.20	
Lamp bulbs and torches	...	728.80	9,448.41
(c) On repairs:			
Caravan and Blackstone	...	3,540.89	
Painting	...	54.10	
Projectors	...	386.46	3,981.45
(d) On films:			
Cost of films	...	6,219.40	
Cost of copies	...	1,755.19	7,974.59
		Total	$32,079.89

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A NOTE ON THE GERMINATION OF PADI

BY

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It is considered generally that freshly harvested padi cannot satisfactorily be used for seed purposes. Among Malay padi planters the belief appears to be current that seed padi should be not less than 100 days old, and it is further opined that such plants as are raised from newly harvested padi do not fruit well. Lord* states that newly harvested seed, unless dead ripe, will not germinate but that after a period of 2 to 2½ months a satisfactory germination is obtained. At Titi Serong, a small experiment designed to examine the above contentions was conducted after the harvest of 1936.

Methods.

An area of Mayang Ebus 208 was allowed to become dead ripe before cutting on 20th February 1936 and the seed reserved for the experiment. On 27th February, and thereafter at 7 days intervals, four lots of 1,000 sound grains were counted out. The samples were enclosed in small muslin bags and soaked in water for 2 days and 2 nights and then air dried for 2 days and 2 nights. On the morning of the fifth day, the number of grains which had germinated was recorded. The method adopted is the normal practice at Titi Serong and the procedure was standardized to ensure that the weekly germination counts would be comparable.

Results.

The percentage weekly germinations of the four samples together with the mean and the standard error of the mean are presented below:—

Table I.

Percentage Weekly Germination of Seed.

No. of Weeks from Harvest	Percentage Germination of Seed					Standard Error of Means
	No. 1	No. 2	No. 3	No. 4	Mean	
1	13.5	15.7	16.8	13.5	14.9	0.66
2	21.5	28.0	26.9	22.0	24.6	2.77
3	40.0	48.7	47.6	38.8	43.8	6.5
4	63.6	78.3	73.5	67.0	70.6	10.8
5	80.7	77.8	74.2	84.7	79.4	4.95
6	96.8	93.2	82.4	96.3	92.2	11.25
7	99.0	98.4	98.4	98.1	98.5	0.04
8	99.2	98.5	98.4	98.3	98.6	0.04
9	99.2	99.0	91.1	97.9	98.8	5.02
10	99.2	88.5	98.3	99.1	96.3	6.76
11	99.5	99.1	99.2	99.1	99.2	0.01
12	99.4	99.2	98.9	99.5	99.3	0.02

* The Cultivation of Rice in Ceylon, *Empire Journal of Experimental Agriculture*, Vol. 3. p. 123.

Under the conditions of the trial, it would appear that very new seed does germinate poorly but the germination rapidly improves as the seed ages until, at the end of the sixth week after cutting, a quite satisfactory figure is obtained. Subsequently, the germination is only slightly enhanced with age. The trial was discontinued after the twelfth week when, with seed still less than 100 days old, a 99 per cent. germination was obtained. However, whether or not the contention that plants raised from very fresh seed padi do not yield heavily is a correct one still remains to be examined.

As stated, the method adopted is the customary one at Titi Serong Experiment Station but it was found in the early weeks that, if after the first soaking and drying, the seed was re-soaked, or the initial soaking prolonged to three days, or if counts were continued on the sixth and seventh day after taking the sample, the germination was much better. It is probable that, should circumstances arise in which the use of freshly harvested seed padi is unavoidable, a quite good, if slow, germination would be obtained by a longer or a double soaking.

Received for publication 5th August, 1936.

CONDITIONS ON RUBBER SMALL HOLDINGS IN MALAYA.

3rd Quarter, 1936.

Prepared by the Economics Branch of the Department of Agriculture, Straits Settlements and Federated Malay States, in collaboration with the Field Branch of the Department.

Rainfall.

The quarter was exceptionally dry with conditions approaching those of drought in many districts during July and August; heavy rains were experienced fairly generally in the second half of September. The exception to these conditions was the Malacca Settlement where July and August were wet months, and September dry.

Prices.

Table I shews the lowest and highest prices paid for small-holders' rubber throughout Malaya, Table II giving the mean of the range.

Prices were on a slightly higher level, the difference between the extremes of ranges being notably reduced. Prices for unsmoked sheet and scrap were also higher, the former being, in many cases, only slightly less than for the smoked grade.

Production.

Figures of production of rubber on small holdings during the quarter are published in Table III. This table is compiled from the monthly report of production, stocks, imports and exports of rubber published by the Registrar-General of Statistics, S.S. and F.M.S.

Tapping.

Table IV shews the results of the quarterly survey of small holdings out of tapping. The estimates are obtained by counting the number of holdings out of tapping, and applying the percentage to the total area of small holdings in the District.

An additional table (Table V) is included in this report, shewing, for the purpose of comparison, corresponding figures for 1935 and for the end of the second quarter of this year.

It will be noted that there was a general increase in holdings in tapping, and this appears to be principally due to the higher price obtainable for uncouponed rubber.

Condition of Holdings.

Some reports criticize adversely the condition of holdings, particularly those of absentee landlords, although a Johore report states that the improved economic position of the small-holder is reflected in increased activity in the holdings in the form of slashing of undergrowth, digging drains and repairing existing ones.

Table I.

Lowest and Highest Rubber Prices Paid by Local Rubber Dealers.

(In Straits dollars per picul (133 1/3 lbs.))

3rd Quarter 1936.

	Penang	Perak	Selangor	Negri Sembilan	Pahang	Malacca	Kedah	Johore
			JULY					
Smoked sheet	33.00-35.00	32.00-34.85	32.80-35.00	31.50-35.00	31.00-36.10	32.00-34.50	30.50-35.20	32.00-35.00
Unsmoked sheet	32.50-34.80	30.00-34.60	30.00-34.30	31.50-34.00	25.50-33.50	30.00-32.50	28.00-34.00	29.00-34.70
Scrap	22.50-28.50	—	27.00-28.30	—	—	28.00-30.50	26.00-30.00	25.00-30.00
			AUGUST					
Smoked sheet	33.00-35.00	32.50-34.80	32.60-34.50	32.00-35.00	30.00-34.50	32.50-34.50	31.00-34.50	32.00-34.60
Unsmoked sheet	32.50-34.20	28.10-33.90	30.00-33.80	31.50-33.80	25.00-33.50	30.50-33.00	29.00-33.70	29.00-34.00
Scrap	19.00-28.50	—	28.00-28.50	—	—	27.50-31.00	28.00-29.70	25.00-29.00
			SEPTEMBER					
Smoked sheet	33.00-34.51	32.80-34.80	32.00-35.00	31.80-35.50	30.00-34.60	33.00-34.50	33.00-34.80	32.00-34.30
Unsmoked sheet	32.80-34.10	30.00-33.65	31.00-34.00	31.50-33.60	27.00-33.25	32.00-33.50	31.20-33.50	29.00-33.50
Scrap	23.50-28.50	—	26.00-29.30	—	—	27.00-30.00	27.00-29.50	25.00-28.50

Table II.

Mean of Lowest and Highest Rubber Prices Paid by Local Dealers at a number of Centres in each State.

(In Straits dollars per picul (133 1/3 lbs.))

3rd Quarter 1936.

	Penang	Perak	Selangor	Negri Sembilan	Pahang	Malacca	Kedah	Johore
			JULY					
Smoked sheet	33.94-34.84	33.03-34.28	33.55-34.50	32.72-34.62	32.48-34.42	32.83-33.83	33.18-34.80	33.08-34.18
Unsmoked sheet	33.03-33.95	31.54-33.16	31.56-33.53	31.80-33.48	30.12-31.64	31.17-32.00	31.38-33.83	31.64-33.11
Scrap	25.38-26.75	—	27.50-28.15	—	—	28.50-29.33	26.83-29.00	26.37-27.34
			AUGUST					
Smoked sheet	33.91-34.61	33.22-34.06	33.08-33.91	33.10-34.43	32.00-33.87	33.17-34.00	33.00-34.26	33.23-33.92
Unsmoked sheet	32.68-33.68	31.31-32.57	31.03-32.58	32.00-33.40	29.84-30.85	31.50-32.50	31.50-32.30	31.90-32.88
Scrap	24.50-26.20	—	28.00-28.50	—	—	28.00-29.50	28.17-28.90	27.31-28.19
			SEPTEMBER					
Smoked sheet	33.75-34.47	33.16-33.99	33.08-34.28	33.02-34.30	32.23-34.02	33.33-34.33	33.30-34.12	33.14-33.75
Unsmoked sheet	32.95-33.70	31.52-32.54	31.50-32.75	31.96-33.05	29.85-31.05	32.33-33.33	32 08-33.00	31.66-32.65
Scrap	25.75-27.00	—	27.50-27.90	—	—	28.50-29.33	27.83-29.33	26.84-27.73

Table III.

Production of Rubber on Small Holdings.

(in tons)

	Total Jan.-Sept. 1935	1st Quarter 1936	2nd Quarter 1936	3rd Quarter 1936	Total Jan.-Sept. 1936
Federated Malay States ...	53,365	14,796	13,108	17,437	45,341
Unfederated Malay States ...	42,874	11,561	13,549	15,314	40,424
Straits Settlements ...	10,240	2,997	3,019	3,245	9,261
Total ...	106,479	29,354	29,676	35,996	95,026

Diseases.

Mouldy Rot continued to be the disease most prevalent throughout small holdings, but the dry weather was not conducive to its spread, and it was only at the end of the quarter in most districts that the disease assumed serious proportions. Root Disease was prevalent, but small-holders could not be induced to make any effort to effect its control. A few cases of Pink Disease were reported from some districts.

The practice of allowing undergrowth has reduced the risks of erosion, but mention is made in the Negri Sembilan report of excessive erosion in some Districts of that State, where no control measures have been undertaken.

Grades of Rubber.

The small margin between the prices paid for smoked and unsmoked sheet has naturally resulted, in most States, in a marked preference for the production of the unsmoked grade. On the other hand it is evident that the campaign to encourage the small-holder to erect the cheap form of smoke-house is having a very definite effect in some localities.

Kedah.—There was a considerable increase in the quantity of smoked sheet purchased, and a big decrease in the sale of scrap rubber with the exception of the Kuala Muda District. The percentages of smoked sheet, unsmoked sheet and scrap respectively were: North Kedah 91.3, 2.4, 6.3, Central Kedah 66, 9, 25; South Kedah 50, 44, 6.

Table IV.

Estimated Acreage of Tappable Rubber which was out of Tapping on Holdings of less than 100 Acres, at the end of September, 1936.

PERAK				SELANGOR				NEGRI SEMBILAN				PAHANG			
District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage
Batang Padang	33,227	6,645	20	Klang	15,410	6,472	42	Seremban	22,176	17,962	81	Raub	9,342	4,764	51
Kinta	36,090	4,691	13	Kuala Langat	23,333	7,233	31	Tampin	16,961	11,703	69	Kuala Lipis	14,588	1,750	12
Kuala Kangsar	79,572	24,667	31	Ulu Langat	39,856	13,959	35	Kuala Pilah	26,586	20,737	78	Bentong	11,574	2,893	25
Upper Perak	12,680	5,072	40	Ulu Selangor	25,857	15,772	61	Jelebu	8,917	2,140	24	Other Districts†	40,383	11,711	29
Larut & Selama	38,211	10,316	27	Kuala Lumpur†	19,327	8,117	42	Port Dickson	11,634	5,235	45				
Krian	9,270	6,025	65	Kuala Selangor†	9,512	3,995	42								
Lower Perak*	25,982	8,054	31												
Dindings	9,273	7,882	85												
	244,304	73,352	30		133,295	61,548	46		86,274	57,777	67		75,887	21,118	28

MALACCA				PENANG & P. WELLESLEY				SINGAPORE			
District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage
Central	13,100	2,621	20	North	3,941	433	11	Singapore	20,591	617	3
Alor Gajah	30,205	9,060	30	Central	9,549	4,201	44				
Jasin	22,883	2,745	12	South	7,608	5,480	73				
				Penang	15,822	1,265	8				
	66,195	14,426	22		30,820	11,379	31		20,591	617	3

JOHORE	322,225	77,334	24
KEDAH	100,691	30,260	9

The percentage of areas out of tapping in June, 1936, was as follows:—Perak 31, Selangor 58, Negri Sembilan 57, Pahang 34, Malacca 36, Penang and Province Wellesley 30, Singapore 4.

*Estimated from percentage for Kuala Kangsar.

†Estimated from percentage for other Districts in the State.

Table V.

Comparison of Areas of Rubber Small Holdings Out of Tapping.

	September, 1935		June, 1936		September, 1936	
	Acres	Percentage	Acres	Percentage	Acres	Percentage
F. M. S.	145,200	27.2	219,328	40	213,795	39.6
S. S.	24,000	20.6	35,595	29	26,422	21.3
Johore	not available		103,112	32	77,334	24
Kedah	not available		42,300	42	39,269	39
Malaya*	—	—	400,335	36.8	356,820	32.8

*Ignoring Perlis, Kelantan and Trengganu, in which States the area of rubber small holdings is relatively small.

Perak.—The ratio of smoked to unsmoked sheet at Bagan Serai again rose slightly to 36.25 to 63.75. In Selama most of the sheet is smoked. In Trong the proportion of smoked sheet rose from 46 per cent. in July to 88 per cent. in September, but quantities bought in the latter month were comparatively small, and it is likely that most of the small-holders, who normally produce unsmoked sheet, disposed of their crop early in the quarter when the issue of coupons took place.

In Perak Central the proportion of smoked sheet was 64 per cent., to 36 per cent. of unsmoked sheet, but this high percentage of smoked sheet does not necessarily represent the work of the small-holder himself, as many pay to have their sheet smoked by Chinese. In Perak South the percentages were: smoked 42, unsmoked 58.

Selangor.—A marked preference continues to be shewn for smoked sheet.

Penang and Province Wellesley.—With the premium for smoked sheet being reduced, most small-holders owning smoke-cabinets stopped using them. Percentages of grades were: smoked 9, unsmoked 79, scrap 12.

Malacca.—There was a slight increase in the percentage of unsmoked sheet in all Districts; percentages of smoked and unsmoked respectively were: Central 78.6, 15.8 (scrap 5.6); Alor Gajah nil, 99; Jasin 23, 76.

Negri Sembilan.—Preference for unsmoked sheet was shewn in most localities, and the mean of percentages of purchases by 27 dealers was: smoked 47 per cent., unsmoked 53.

General.

The rubber dealers' scheme in Pahang continued to work smoothly, and marked improvement in the quality of sheet rubber is reported from the Temerloh and Lipis Districts. The Pahang report also states that the restriction of new planting is causing large areas of new lands to be planted with fruit and other economic food crops.

It is reported from Johore Central that young rubber is being brought into tapping, the incentive being the good prices obtainable in the District for uncouponed rubber. On the contrary, in Pahang the tapping of young rubber is inclined to be postponed slightly in all districts until the trees are of a fair size.

Arrangements are being made for the budgrafting of a holding of 30 acres belonging to a Muar small-holder.

Twenty-eight new smoke-houses were erected during the quarter, and five more are under construction.

Reviews.

The Oriental Migratory Locust (*Locusta migratoria manilensis* Meyen) and the Bombay Locust (*Patanga succincta* L.) in Malaya.

By G. H. Corbett and N. C. E. Miller, Special Bulletin, Scientific Series No. 18, Department of Agriculture, Straits Settlements and Federated Malay States, 1936, 15 pp. Price 50 cents (Straits Currency) or 1s. 2d. post free.

In the above bulletin, Messrs. G. H. Corbett and N. C. E. Miller give an interesting summary of the appearances in Malaya of the Oriental Migratory Locust and the Bombay Locust.

This paper will be of particular significance to those who experienced locust swarms in parts of this country between 1913 and 1917, and it is one that is commended to the attention of all who have any local agricultural interests at the present time.

Its fifteen easily-read pages ending with a bibliography of the relevant literature are supplemented by a preface written by the Acting Director of Agriculture (who himself took an active part in the former Locust Destruction Campaign), and after the text there is a plate showing the locality in which a subsequent, isolated outbreak occurred in 1930 (fortunately detected and dealt with before more serious consequences could develop), and two maps of Malaya shaded to show the local distribution of the two species concerned.

Locusts, like embers, are liable to cause immense damage if neglected, and the writers of this paper have done a real service in focussing attention once more on these potential devastators.

H. M. P.

Annual Report of the Departments of Agriculture, Malaya, for the year 1935.

By H. A. Tempany, C.B.E., D.SC., F.I.C., F.C.S., Director of Agriculture, Straits Settlements, and Adviser on Agriculture, Malay States. F.M.S. Government Press, Kuala Lumpur, F.M.S., 1936, 84 pp. Price 50 cents (Straits Currency) or 1s. 2d. post free.

This report is in five sections, and although it approximates very closely to the general form of previous reports, certain modifications have been introduced into it.

Section I contains information regarding weather conditions, various major and minor crops, sugar and alcohol, livestock, dairy produce, poultry and eggs

and feeding stuffs for animals, while Section II is concerned with the work of the Department of Agriculture. Section III deals with the Advisory Committee, Section IV with finance, and Section V contains a summary of agricultural legislation enacted during 1935.

The reviewer draws the attention of the reader to the fact that this is the last annual report presented by the Director, who, in conclusion, states "in the seven years during which I have had charge of the Department of Agriculture the whole of the departmental working has been brought under review, and complete reorganisation effected of practically the whole of the agricultural services. During the same period the operation of the Department has greatly extended and many new lines of work have been undertaken."

This report will be found valuable by those who wish to obtain information regarding progress made in the scientific and educational work carried out by the Department of Agriculture and by those who desire facts concerning the agricultural position during 1935.

N. C. E. M.

Reports of the Research, Economic and Agricultural Education Branches for the Year 1935.

Special Bulletin, General Series No. 24, Department of Agriculture, Straits Settlements and Federated Malay States, 1935, 89 pp. Price 50 cents (Straits Currency) or 1s. 2d. post free.

This bulletin summarizes the work of six divisions of the Research Branch (the Division of Economic Botany having been incorporated with the Division of Soils and Plant Physiology), and of the Economics and Statistics and Agricultural Education Branches.

The information supplied is more complete than that published in the Annual Report of the Adviser on Agriculture, and will undoubtedly be of considerable interest to planters and others engaged in agricultural work both in Malaya and in other tropical countries.

N. C. E. M.

Malayan Agricultural Statistics 1935.

By D. H. Grist. Special Bulletin, Economic Series No. 7, Department of Agriculture, Straits Settlements and Federated Malay States 1936. Price 50 cents (Straits Currency) or 1s. 2d. post free.

With certain additions this bulletin follows the lines of previous bulletins on the same subject. It concerns Malayan agriculture in 1935 and comprises import and export figures, for a period of several past years, of agricultural products, areas and production of the principal agricultural crops, market prices in 1935 and figures in relation to livestock. Meteorological data are also supplied. The present number has 90 tables, two graphs and an adequate index.

N. C. E. M.

Departmental.

FROM THE DISTRICTS.

Compiled by the Chief Field Officer from Monthly Reports from Agricultural Officers.

October, 1936.

The Weather.

The frequent showers characteristic of October weather prevailed throughout the country, but the total precipitation was below normal at nearly all stations, except those in Malacca and Kelantan.

In Malacca and the adjoining areas of Tampin in Negri Sembilan and Muar in Johore, unusually heavy rain fell during the second half of the month and the total precipitation was much above normal. In Kelantan, the monsoon rains began on the 15th and very heavy falls occurred during the last few days of the month.

Short spells of comparatively dry weather at the beginning of the month are recorded in parts of Kedah, South Perak, Selangor and Kelantan.

Remarks on Crops.

Padi.—In Kedah, flooding occurred early in the month in Kota Star and Kuala Muda, over 4,000 acres in the former and some 800 acres in the latter District being inundated. In Kuala Muda the floods which were occasioned by overflow of the Muda river, quickly subsided and little damage was done to the crop; but in Kota Star over 2,000 acres of padi were destroyed, though it is expected that all save some 300 acres of this will be replanted.

There was also some flooding of the crop in parts of Malacca at the end of the month, but at the time of report no estimate of damage was possible as the floods had not sufficiently subsided.

Harvesting has commenced at Kajang in Selangor and in the Temerloh and Bentong Districts of Pahang and in some of the Pahang river areas.

In other parts where the crop has been planted or planting is in progress the weather was conducive to good growth.

At Panchang Bedena in Selangor conditions had improved considerably at the end of the month, but water was still insufficient for transplanting over most of the area. In Kelantan, the late planted dry padi shows only moderate growth and tillering but the early planted dry padi and all wet padi are very promising.

Rubber.—The price for all grades of rubber increased slightly.

Three further smoke cabinets were erected in Perak South Circle, two in Pahang, one in Malacca, and four in Johore.

Tests of locally sold coagulants for the presence of sulphuric acid show that the position varies considerably in different parts of the country. For instance,

whilst it is reported that none was encountered in Johore North Circle, sulphuric acid was found to be in fairly common use in Johore Central Circle.

In response to the wishes of the owners, arrangements have been made for budgrafting to be done under the advice and supervision of the Rubber Research Institute on one Asiatic estate in Kedah, two holdings in Perak South Circle and one in Johore.

Coconuts.—The price of copra remained firm with the Penang quotation for sundried around $6 per picul. It reached $6.29 on the 30th.

The exceptionally severe seasonal decline in crop noted last month for Province Wellesley appears to be general and is specially stressed in reports from Johore where the decline is stated to be not only more severe than usual, but also more prolonged. The shortage of nuts has resulted in increased prices being paid, in a number of localities, for those used for domestic purposes.

Agricultural Stations and Test Plots.

Agricultural Stations.—Recent systematic work on the analysis of the roots of various species and varieties of Derris has enabled a review to be made of the tuba planted on Agricultural Stations and of the sources of supply, and advice has been given to replace all inferior material with plants of greater toxic value.

The Gaja Mati Station in Kedah has been extended by taking in a further 2 acres of jungle, part of which will be utilized for poultry.

At Kuala Kangsar Station in Perak, chlorosis of coffee, which appeared to have yielded to treatment last year by the application of ammonium sulphate, has reappeared, possibly as the result of the dry weather experienced during the past few months.

At Tanah Rata Station, Cameron Highlands, a good start has been made in raising seedlings of *Cinchona succirubra* as stocks for the budding of *Cinchona Ledgeriana,* with a view to increasing the area under this plant.

In Johore, at the Kota Tinggi Agricultural Station, work was completed on clearing the area set aside for pineapple experiments and selections, whilst fencing was completed on the Tongkak and Central Agricultural Stations.

Padi Stations and Test Plots.—Reaping commenced at Kajang Plot in Selangor and at the Kerbau Plot in Temerloh, Pahang, whilst the plants are flowering on Bawang and Pekan Plots in Pahang. Growth is disappointing on Ulu Klawang Plot in Negri Sembilan and at Kuala Linggi Plot in Malacca. The dry padi at Bachok Station in Kelantan has made poor growth and seedlings of wet padi are scarce, owing to a number having been lost in the nurseries from drought. Insufficient water prevented transplanting at the Panchang Bedena Plot in Selangor, but it is anticipated that it will be possible to commence early in November.

On all other Stations and Plots growth is reported to have been satisfactory during the month.

DEPARTMENTAL NOTES.

Visits of the Adviser on Agriculture.

The Acting Adviser on Agriculture visited Penang, Province Wellesley, Krian, and the South Circle of Perak from the 26th to 29th October for the purpose of inspecting Agricultural Stations and Padi Test Plots.

Agricultural Leaflets.

Leaflet No. 13 on Maize is now available, and can be obtained free on application to the Department of Agriculture, S.S. & F.M.S., Kuala Lumpur.

Rural Lecture Caravan.

The Rural Lecture Caravan continued the interrupted tour commenced in July last and visited Kuala Pilah District and one centre in Tampin. Weather conditions made it necessary to cancel one or two performances but otherwise the tour was successful.

Leave.

Mr. R. B. Jagoe, Assistant Botanist, returned from leave on the 23rd October, and resumed duty on that date.

Statistical.
MARKET PRICES.

October, 1936.

Major Crops.

Rubber.—The market improved again steadily throughout the month, and, towards the close, the price rose steeply with the announcement of the International Rubber Regulation Committee's decision to permit an additional release of 5 per cent. for the first half of 1937.

Spot loose opened in Singapore at 27 cents per lb. rising, on the 24th to 27½ cents at which figure it remained until the 28th when it rose sharply to 28⅛ cents, closing at 28 11/16 cents on a still rising market.

The average price for the month of No. 1. X. Rubber Smoked Sheet was 27.49 cents per lb. as compared with 26.65 cents in September. The London average price was 7.88 pence per lb., and the New York price 16.44 cents gold, as compared with 7.68 pence and 16.36 cents gold in September.

Prices paid for small-holders' rubber at three centres during the month are shewn in the following table.

Table I.
Weekly Prices Paid By Local Dealers for Small-Holders' Rubber, October, 1936.

(Dollars per Picul.)

Grades.	Kuala Pilah, Negri Sembilan.					Kuala Kangsar, Perak.				Batu Pahat, Johore.			
	1	8	15	22	29	7	14	21	28	7	14	21	28
Smoked sheet	34.25		35.10				34.35	34.66	33.55				
Unsmoked sheet	33.79	33.11	33.99	33.00	33.92	32.01	32.00		33.50	33.00	33.20	33.20	33.50
Scrap													

Transport by F.M.S.R. lorry service Kuala Pilah to Seremban 12 cents per picul, to Malacca excluding duty, 25 cents per picul, by rail Seremban to Penang $1.24 per picul, Seremban to Singapore $8.00 per ton.
Transport from Batu Pahat to Singapore by lorry excluding duty, 90 cents per picul.
Transport from Kuala Kangsar to Prai by railway $6.20 per ton.
Transport from Kuala Kangsar to Singapore by railway $10.00 per ton (minimum consignment 5 tons).
At Kuala Pilah the standard deduction for moisture in unsmoked sheet is 5 per cent.
At Kuala Kangsar the standard deduction for moisture in unsmoked sheet is 10 per cent.

Palm Oil.—Table II shews the trend of the market for the Malayan commodities during October.

Table II.
Prices of Palm Oil and Palm Kernels.

Date 1936.	Palm Oil in Bulk, c.i.f. landed weight Liverpool/ Halifax.	Palm Kernels, c.i.f. landed weight London/ Continent
	per ton	per ton
October 2	£ 22. 0. 0	£ 10. 15. 0
„ 9	22. 0. 0	11. 2. 6
„ 16	21. 0. 0	11. 0. 0
„ 23	21. 0. 0	11. 10. 0
„ 30	23. 0. 0	11. 15. 0

Copra.—With keen buying enquiry prices rose steadily and considerably during the month. The sun-dried grade opened in Singapore at $5.35 per picul, and closed at $6.20, the average for the month being $5.83 per picul as compared with $5.58 in September. The mixed quality averaged $5.49 per picul as against $5 in the previous month, the difference in price between the two grades being reduced.

Copra cake continued unchanged throughout the month at $2 per picul.

Rice.—The average wholesale prices of rice per picul in Singapore in September were as follows:— Siam No. 2 (ordinary) $3.75, Rangoon No. 1 $3.47, Saigon No. 1 $3.77, as compared with $3.85, $3.47 and $3.57 respectively in August. The corresponding prices in September 1935 were $4.29, $3.75, and $3.77.

The average retail market prices in cents per gantang of No. 2 Siam rice in September were: Singapore 25, Penang 28, Malacca 26, as compared with 26, 30 and 26 respectively in August.

The average declared trade value of imports of rice in September was $3.60 per picul, as compared with $3.52 in August and $3.57 in July.

Padi.—The Krian Government Rice Mill maintained its price at $1.90 per picul throughout October. Retail prices of padi ranged from 6 to 14 cents per gantang.

Pineapples.—Prices weakened on reports that stocks in the United Kingdom were large, and on lack of buying enquiry. Closing prices per case were: Cubes $3.25, Sliced Flat $3.05, Sliced Tall $3.35.

Prices of fresh fruit per 100 were as follows:— Singapore $2.20 to $2.30; Selangor $1.20 to $1.50; Johore 1st quality $1.80 to $4, 2nd quality $1.40 to $4, 3rd quality 70 cents to $2.

Beverages.

Tea.—Nine consignments of Malayan tea were sold on the London market during October and the last week of September. One consignment was of upland tea and was sold at 1s. 0¼d. per lb.; the lowland tea ranged from 11¼d. to 11¾d. per lb.

Average London prices per lb. during October for consignments of tea from other countries were as follows:— Ceylon 1s. 1.79d., Java 11.07d., Indian Northern 1s. 1.31d., Indian Southern 1s. 0.02., Sumatra 10d.

The latest Colombo average prices available are quoted from the *Weekly Tea Market Report,* 27th October, 1936, of the Colombo Brokers' Association, and are as follows, in rupee cents per lb:— High Grown Teas 71 cents, Medium Grown Teas 67 cents, Low Grown Teas 64 cents.

Coffee.—Sourabaya coffee weakened again slightly in Singapore during the month, averaging $12.30 to $13.30 per picul as compared with $12.50 to $13.50 in September. Palembang coffee improved to average $7.75 to $9.25 per picul as compared with $6.70 to $8.05 in the previous month.

Spices.

Arecanuts.—The following are the averages of the ranges of prices per picul in Singapore during October: Splits $4.75 to $7.05; Red Whole $5 to $6; Sliced $7.85 to $9.95.

The Singapore Chamber of Commerce prices weakened during October, and average prices per picul were: Best $6.96, Medium $6.54, Mixed $5.85.

Pepper.—The announcement that the London Pool had raised its selling limit resulted in speculative buying on this side, and quotations shewed a substantial advance. This improvement was, however, only temporary, and prices fell back at the close. Average prices per picul for the month were: Singapore Black $8.20, Singapore White $14.90, Muntok White $15.70, as compared with $7.25, $13 and $13.14 respectively in September.

Nutmegs.—Both 110's and 80's were quoted at the same prices during October, and after weakening in the middle of the month, improved at the close, averaging $28.80 per picul as compared with $29.25 and $29.75 respectively in the previous month.

Mace.—Siouw improved to close at $100 per picul, averaging $94 per picul as compared with $92.50 in September. Amboina weakened in price, and averaged $78.40 per picul as against $82.50 in the previous month.

Cardamoms.—Green cardamoms were quoted during October in the Ceylon Chamber of Commerce reports at Rs.1.60 to Rs.1.87 rising at the close to Rs.1.85 to Rs.1.98 per lb.

Miscellaneous.

Derris (Tuba Root).—More enquiries were in evidence during October but prices remained unchanged at the September levels of $48 per picul for roots sold on a basis of rotenone content, and $30 per picul for roots sold on a basis of ether extract.

Gambier.—Prices in Singapore improved still further in October, Block being quoted at $5.25 per picul throughout the month and No. 1 Cube at $10.50, as compared with $5 and $10 respectively in September.

Tapioca.—Singapore prices remained unchanged throughout the month, and were: Flake, Fair $5.50, Seed Pearl $5.75, Medium Pearl $6.50 per picul.

Sago.—Keen buying enquiry improved prices considerably in Singapore during October. Average prices per picul were: Pearl, Small Fair $4.63, Flour, Sarawak Fair $3.13, as compared with $4.38 and $2.86 in the previous month.

Tobacco.—Prices of locally grown tobacco varied considerably, the general range per picul being: 1st quality $18 to $47, 2nd quality $14 to $32, 3rd quality $10 to $21.50. In Kelantan the range was $90, $70 and $50, and in Johore $90, $75 and $25, while in Selangor $100 was quoted for the 2nd quality and $75 for the 3rd.

Charcoal.—This commodity is again in demand at prices which leave a reasonable margin of profit. A leading buyer is prepared to take between 200 and 300 tons a month in 100 ton lots. Price quotations are difficult to obtain but it has been learned that, in May last, London was quoting £8 per ton sellers, £7.15s. buyers.

The issue of this Journal for April, 1935, contained a useful summary of information on the subject of coconut charcoal, and copies may be purchased on application.

The above prices are based on London and Singapore daily quotations for rubber; on the Singapore Chamber of Commerce Weekly Reports for the month and on other local sources of information. Palm oil reports are kindly supplied by Messrs. Guthrie & Co. Ltd., Kuala Lumpur; the Singapore prices for coffee and arecanuts by the Lianqui Trading Company of Singapore, and tuba prices by Messrs. Kohyei & Co., Singapore.

1 picul = 133⅓ lbs. The Dollar is fixed at two shillings and four pence.

Note.—The Department of Agriculture will be pleased to assist planters in finding a market for agricultural produce. Similar assistance is also offered by the Malayan Information Agency, 57 Trafalgar Square, London, W.C. 2.

GENERAL RICE SUMMARY*

September, 1936.

Malaya.—Imports of foreign rice during September were 50,186 tons,† and exports 15,141 tons, net imports being 35,045 tons. Net imports for the period January to September, 1936, aggregated 391,633 tons as compared with 353,470 tons in 1935.‡

Of the imports during September 50 per cent. were consigned to Singapore, 18 per cent. to Penang, 7 per cent. to Malacca, 16 per cent. to the Federated Malay States, and 9 per cent. to the Unfederated Malay States. The imports by country of origin were as follows (in tons, percentages in brackets):— Siam 33,623 (67.0); Burma 15,783 (31.4); French Indo-China 91 (0.2); and other countries 689 (1.4).

Of the September exports 64 per cent. were consigned to the Netherlands Indies, and 36 per cent. to other countries. The various kinds of rice exported were as follows (in tons, percentages in brackets):— Siam 12,163 (80.3); Burma 2,332 (15.4); French Indo-China 379 (2.5); parboiled 186 (1.2); local production 81 (0.6).

India and Burma.—Foreign exports for the first eight months of the year totalled 972,000 tons, a decrease of 26.6 per cent. compared with 1935. Of these exports 3.6 per cent. were to the United Kingdom, 17.9 per cent. to the Continent, 28.7 per cent. to Ceylon, 20.9 per cent. to the Straits Settlements and the Far East, and 28.9 per cent. to other countries. The corresponding percentages for 1935 were 4.3, 10.9, 22.8, 32.2, and 29.8.

Siam.—Exports of rice and rice products from Bangkok during July were 128,536 tons; the cumulative total for the year was 944,025 tons as compared with 883,187 tons in 1935.

Japan.—No additional information is available since the August Summary, except for the confirmation of the earlier estimate of 665,000 tons for the yield of the first Formosan rice crop, constituting a new record for Formosa.

French Indo-China.—Entries of padi into Cholon during the first nine months of the year totalled 1,275,689 tons, a decrease of 8.6 per cent. as compared with 1,395,554 tons in 1935. Exports of rice during the same period were 1,371,077 tons as compared with 1,439,382 tons in the previous year, a decrease of 4.7 per cent.

The Netherlands Indies.—The latest information available was published in the July Summary.

Ceylon.—Imports during the first nine months of 1936 totalled 398,563 tons as compared with 396,122 tons in 1935, an increase of 0.6 per cent. Of these imports 13.2 per cent. were from British India, 62.2 per cent. from Burma, 0.5

* Abridged from the Rice Summary for September, 1936, compiled by the Department of Statistics, Straits Settlements and Federated Malay States.

† Tons = long tons (2,240 lbs.)

‡ It is to be understood throughout the summary that all comparisons and percentage increases or decreases are in relation to the corresponding period of 1935.

per cent. from the Straits Settlements, and 24.1 per cent. from other countries. The corresponding 1935 percentages were 12.6, 67.9, 0.9 and 18.6.

Europe and America.—Shipments from the East to Europe during the period 1st January to 10th September totalled 894,639 tons, an increase of 54.8 per cent. when compared with the 1935 shipments of 578,072 tons. Of the 1936 shipments 30 per cent. were from Burma, nil from Japan, 60.8 per cent. from Saigon, 8.2 per cent. from Siam, and 1 per cent. from Bengal. The corresponding 1935 percentages were 54.4, 4.1, 35.3, 4.4 and 1.8.

Shipments for the Levant from 1st January to 10th September aggregated 9,363 tons, as compared with 24,899 tons in 1935, a decrease of 62.4 per cent. Shipments during the same period for Cuba, West Indies and America increased by 4.4 per cent. from 177,141 tons in 1935 to 184,850 tons in 1936.

MALAYAN AGRICULTURAL EXPORTS, SEPTEMBER, 1936.

PRODUCT.	Net Exports in Tons				
	Year 1935	Jan.-Sept. 1935	Jan.-Sept. 1936	September 1935	September 1936
Arecanuts ...	21,885	16,032	21,238	1,751	881
Coconuts, fresh † ...	106,272†	78,958†	93,025†	8,714†	14,593†
Coconut oil ...	35,911	24,569	34,819	3,309	4,166
Copra ...	111,752	77,964	56,113	7,951	11,496
Gambier, all kinds ...	2,837	2,068	1,594	299	191
Oil cakes ...	11,361	7,378	11,996	1,905	1,581
Palm kernels ...	3,892	2,592	3,420	200	677
Palm oil ...	24,996	16,796	21,090	2,956	3,145
Pineapples canned ...	73,923	55,369	63,891	3,419	3,323
Rubber ¶ ...	378,381¶	292,143¶	265,159¶	27,353¶	30,430¶
Sago,—flour ...	10,920	6,510	6,602	1,763	1,075
,, —pearl ...	4,655	3,479	2,441	366	315
,, —raw ...	7,735*	5,149*	5,494*	584*	719*
Tapioca,—flake ...	1,953	1,432	1,216	151	86
,, —flour ...	755*	531*	1,402*	112*	74*
,, —pearl ...	17,169	13,019	12,864	1,508	1,255
Tuba root ...	567	430	490	33	51

† hundreds in number. * net imports. ¶ production.

MALAYAN PRODUCTION OF PALM OIL AND KERNELS (IN LONG TONS)

(As declared by Estates)

Month 1936	Palm Oil		Palm Kernels	
	F.M.S.	U.M.S.	F.M.S.	U.M.S
January ...	1,395.4	326.5	258.6	37.2
February ...	1,531.9	372.4	244.2	54.6
March ...	1,878.4	534.5	302.9	88.0
April ...	1,410.6	446.8	250.0	80.0
May ...	1,346.1	644.8	238.1	114.6
June ...	1,557.4	658.3	245.5	100.9
July ...	2,270.5	975.7	349.1	147.6
August ..	2,963.2	1,029.0	419.2	163.0
September ..	2,671.5	969.9	394.2	136.9
Total ...	17,025.0	5,957.9	2,701.8	922.8
Total Jan. to Sept., 1935 ...	12,853.0	4,522.6	1,851.1	662.4
Total for year 1935 ...	17,338.7	5,764.6	2,711.1	818.4

ACREAGES OF TAPPABLE RUBBER NOT TAPPED ON ESTATES OF 100 ACRES AND OVER, FOR THE MONTH ENDING 30TH SEPTEMBER, 1936.

STATE OR TERRITORY	Acreage of Tappable Rubber end 1935	ESTATES WHICH HAVE ENTIRELY CEASED TAPPING		ESTATES WHICH HAVE PARTLY CEASED TAPPING (*a*)		AREA OF TAPPABLE RUBBER NEVER BEEN TAPPED		Total (3) + (5)	Percentage of (9) to (2)
		Acreage	Percentage of (3) to (2)	Acreage	Percentage of (5) to (2)	Acreage	Percentage of (7) to (2)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
STRAITS SETTLEMENTS :—									
Province Wellesley	44,526	400	.9	16,432	36.9	504	1.1	16,832	37.8
Malacca	121,601	5,504	4.5	29,761	24.5	2,848	2.3	35,265	29.0
Penang Island	2,575	675	26.2	499	19.4	264	10.3	1,174	45.6
Singapore Island	34,525	4,099	11.9	9,203	26.6	334	1.0	13,302	38.5
Total S.S. ...	203,227	10,678	5.3	55,895	27.5	3,950	1.9	66,573	32.8
FEDERATED MALAY STATES :—									
Perak	294,988	11,429	3.9	70,491	23.9	14,790	5.0	81,920	27.8
Selangor	332,165	11,017	3.3	66,400	20.0	14,392	4.3	77,417	23.3
Negri Sembilan	258,304	12,536	4.8	55,209	21.4	16,458	6.4	67,745	26.2
Pahang	77,210	9,237	12.0	24,716	32.0	16,415	21.3	33,953	44.0
Total F.M.S. ...	962,667	44,219	4.6	216,816	22.5	62,055	6.4	261,035	27.1
UNFEDERATED MALAY STATES :—									
Johore	432,443	32,629	7.6	61,946	14.3	38,999	9.0	94,575	21.9
Kedah	199,607	14,699	7.4	25,400	12.7	16,157	8.1	40,099	20.1
Kelantan	30,474	403	1.3	9,697	31.8	4,267	14.0	10,100	33.1
Trengganu (*b*)	4,643	Nil	Nil	Nil	Nil	138	3.0	Nil	Nil
Perlis (*c*)	1,575	Nil	Nil	761	48.3	59	3.7	761	48.3
Brunei	6,010	Nil	Nil	1,722	28.7	913	15.2	1,722	28.7
Total U.M.S. ...	674,752	47,731	7.1	99,526	14.7	60,533	9.0	147,257	21.8
TOTAL MALAYA ...	1,840,646	102,628	5.6	372,237	20.2	126,538	6.9	474,865	25.8

Notes :—(*a*) Area out of tapping on Estates which have partly ceased tapping refers to areas definitely being rested and excludes areas on any tapping round.
(*b*) Registered Companies only.
(*c*) Rendered quarterly.

MALAYAN RUBBER STATISTICS — TABLE I

STOCKS, PRODUCTION, IMPORTS AND EXPORTS OF RUBBER, INCLUDING LATEX, CONCENTRATED LATEX AND REVERTEX, FOR THE MONTH OF SEPTEMBER, 1936, IN DRY TONS.

State or Territory	Stocks at beginning of month 1			Production by Estates of 100 acres and over		Production by Estates of less than 100 acres estimated 2		Imports				Exports including re-exports				Stocks at end of month			Consumption 3	
								during the month		January to Sept. 1936		during the month		January to Sept. 1936						
	Ports	Dealers	Estates of 100 acres and over	during the month	January to Sept. 1936	during the month	January to Sept. 1936	Foreign	From Malay States & Labuan	Foreign	From Malay States & Labuan	Foreign	Local	Foreign	Local	Ports	Dealers	Estates of 100 acres and over	during the month	January to Sept. 1936
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
MALAY STATES :—																				
Federated Malay States ...	...	7,362	11,725	11,003	91,018	4,177	45,341	Nil	Nil	Nil	Nil	11,429	4,833	102,090	34,715	...	5,418	12,575	12	85
Johore ...	...	2,658	3,991	4,554	37,003	3,162	27,516	Nil	110	Nil	745	2,046	6,036	19,870	44,855	...	1,876	4,517	...	...
Kedah ...	...	308	2,776	2,636	22,851	563	6,340	Nil	Nil	Nil	Nil	1,547	1,670	12,742	16,948	...	196	2,870	...	...
Perlis ...	...	12	16	13	98	10	165	Nil	Nil	Nil	Nil	Nil	23	Nil	259	...	11	17	...	...
Kelantan ...	...	266	330	315	2,597	218	4,856	Nil	Nil	Nil	Nil	114	425	1,255	6,159	...	203	387	...	...
Trengganu ...	...	55	50	230	2,028	115	1,014	Nil	Nil	Nil	Nil	Nil	345	Nil	3,042	...	55	50	...	...
Brunei ...	...	11	45	43	386	47	533	...	...	...	...	...	90	...	916	...	2	54	...	...
Total Malay States	...	10,672	18,933	18,794	155,981	8,292	85,765	Nil	110	Nil	745	15,136	13,422	135,957	106,894	...	7,761	20,470	12	85
S. SETTLEMENTS :—																				
Malacca ...	...	2,474	1,116	1,100	9,084	921	5,149	Nil		Nil		2,391		21,169		...	2,348	1,224	...	...
Province Wellesley	...	933	522	411	3,646	271	1,954	Nil		Nil		7,064		65,589		...	829	568	...	...
Penang ...	1,914	3,801	8	13	140	167	800	2,545	11,374	23,167	101,347		Nil		Nil	2,203	3,511	5	...	...
Singapore ...	5,927	16,647	169	147	1,282	297	1,212	7,470		104,400		19,519		164,972		5,999	15,223	129	34	227
Labuan ...	...	22	Nil	Nil	Nil	17	146	24		591		Nil		Nil		...	17	Nil	...	...
Total Straits Settlements ...	7,841	23,877	1,815	1,671	14,152	1,673	9,261	10,039	11,374	128,158	101,347	28,974	Nil	251,730	Nil	8,202	21,928	1,926	34	227
Total Malaya ...	7,841	34,549	20,748	20,465	170,133	9,965	95,026	10,039	11,484	128,158	102,092	44,110	13,422	387,687	106,894	8,202	29,689	22,396	46	312

TABLE II
DEALERS' STOCKS, IN DRY TONS 3

Class of Rubber	Federated Malay States	S'pore	Penang	Province We'sly D'dings M'cca.	Johore	Kedah
22	23	24	25	26	27	28
DRY RUBBER	4,694	14,541	3,275	2,855	1,487	87
WET RUBBER	724	682	236	341	339	109
TOTAL ...	5,418	15,223	3,511	3,196	1,876	196

TABLE III
FOREIGN EXPORTS

PORTS 29	For month 30	January to Sept. 1936 31
Singapore ...	28,764	245,065
Penang ...	10,474	95,103
Port Swettenham.	4,631	44,302
Malacca ...	241	3,217
MALAYA ...	44,110	387,687

TABLE IV
DOMESTIC EXPORTS 4

AREA 32	For month 33	January to Sept. 1936 34
Malay States ...	28,558	242,851
Straits Settlements	3,218	22,430
MALAYA ...	31,776	265,281

Notes:—

1. Stocks on estates of less than 100 acres and stocks in transit on rail, road or local steamer are not ascertained.
2. The production of estates of less than 100 acres is estimated from the formula: Production + Imports + Stocks at beginning of month = Exports + Stocks at end of month. + Consumption, *i.e.*, Column [7] = Columns [13] + [14] + [17] + [18] + [19] + [20] − [2] − [3] − [4] − [5] − [9] − [10]. For the Straits Settlements the production of estates of less than 100 acres is represented by sales or exports as shown by cess paid.
3. Dealers' stocks in the Federated Malay States are reduced to dry weights by the following fixed ratios: unsmoked sheet, 15% wet sheet, 25% scrap, lump, etc., 40%; stocks elsewhere are in dry weights as reported by the dealers themselves.
4. Column (33) and (34) represent exports of rubber subject to regulation which, for Singapore and Penang Islands are represented by sales or exports as shown by cess paid.
5. All statements are brought up to date monthly, and any inaccuracies that may be disclosed are corrected in the totals; the latest publication, therefore, is always the most reliable.
6. The above, with certain omissions, is the Report published by the Registrar-General of Statistics, S.S. and F.M.S., at Singapore on 23rd October, 1936.

METEOROLOGICAL SUMMARY, MALAYA, SEPTEMBER, 1936.

Locality.	Air Temperature in degrees Fahrenheit							Earth Temperature		Rainfall								Bright Sunshine.		
	Means of			Absolute Extremes						Total.		Most in a day.	Number of days.					Total.	Daily Mean.	Per cent.
	A. Max.	B. Min.	Mean of A and B.	Highest Max.	Lowest Min.	Lowest Max.	Highest Min.	At 1 foot	At 4 feet			Amt.	Precipitation .01 in or more	Precipitation .04 in or more	Thunder-storm	Fog morning obs.	Gale force 8 or more			
	°F	°F	°F	°F	°F	°F	°F	°F	°F	in.	mm.	in.						Hrs.	Hrs.	
Railway Hill, Kuala Lumpur, Selangor ...	91.2	71.5	81.3	95	68	85	74	83.9	84.7	8.18	207.8	1.68	21	18	4	2	1	172.05	5.73	47
Bukit Jeram, Selangor ...	89.0	72.1	80.5	93	69	86	75	84.3	86.1	2.86	72.7	0.85	17	15	2		1	201.10	6.70	55
Sitiawan, Perak ...	89.2	73.2	81.2	92	71	86	77	84.1	84.8	5.84	148.3	2.39	14	10				178.10	5.94	49
Temerloh, Pahang ...	90.0	72.0	81.0	92	69	87	75	86.1	86.3	7.11	180.6	2.51	16	10	4	11		196.95	6.57	54
Kuala Lipis, Pahang ...	89.4	71.3	80.3	92	68	86	75	83.9	84.9	6.14	156.0	1.38	12	9	3	20		165.55	5.52	46
Kuala Pahang, Pahang ...	88.1	74.1	81.1	90	72	86	76	87.9	87.6	1.93	49.0	1.06	9	5				243.90	8.13	67
Kallang Aerodrome, S'pore ...	85.8	76.0	80.9	89	73	82	80	82.7	84.1	5.85	148.6	2.25	15	11	2			201.55	6.72	55
Butterworth, Province Wellesley ...	86.9	73.9	80.4	90	70	79	77	84.4	85.6	10.56	268.2	4.86	22	17	2			177.40	5.91	49
Bayan Lepas Aerodrome Penang ...	86.4	73.9	80.1	90	71	79	77	83.7	84.4	17.56	446.0	7.46	19	17	2			171.25	5.71	48
Bukit China, Malacca ...	85.1	73.6	79.3	87	70	82	76	83.8	84.1	6.35	161.3	2.91	15	12	3	1	1	191.25	6.37	53
Kluang, Johore ...	88.2	70.4	79.3	91	67	84	74	81.5	82.2	6.87	174.5	2.40	16	11	8	12	1	168.20	5.61	46
Bukit Lalang, Mersing, Johore	87.4	71.2	79.3	91	69	85	74	81.9	82.0	5.43	137.9	1.32	16	13	5		2	208.40	6.95	57
Alor Star, Kedah ...	86.9	74.0	80.5	91	71	79	77	83.3	83.9	12.82	325.6	3.00	24	20				175.85	5.86	48
Kota Bahru, Kelantan ...	89.4	73.6	81.5	91	72	85	76	85.5	85.4	5.15	130.8	0.87	12	11	3			199.55	6.65	54
Kuala Trengganu, Trengganu	88.4	73.1	80.7	91	71	85	75	83.7	84.7	4.95	125.7	1.13	12	9	3			197.90	6.60	55
HILL STATIONS.																				
Fraser's Hill, Pahang 4268 ft.	75.5	62.2	68.9	79	60	70	65	72.3	72.7	6.16	156.5	1.29	15	12		4		181.85	6.06	50
Cameron Highlands, Tanah Rata, Pahang 4750 ft. ...	72.5	56.7	64.6	76	52	65	62	70.7	70.3	10.24	260.1	1.74	23	19	3	2		117.05	3.90	32
Cameron Highlands, Rhododendron Hill, Pahang 5120 ft. ...	71.8	59.2	65.5	76	57	65	61			9.45	240.0	1.49	23	18	3	2		133.95	4.47	37

Compiled from Returns supplied by the Meteorological Branch, Malaya.